



# AIC Executive Seminar

## **E-Commerce in Agriculture** **Why? How? What? Whither?**

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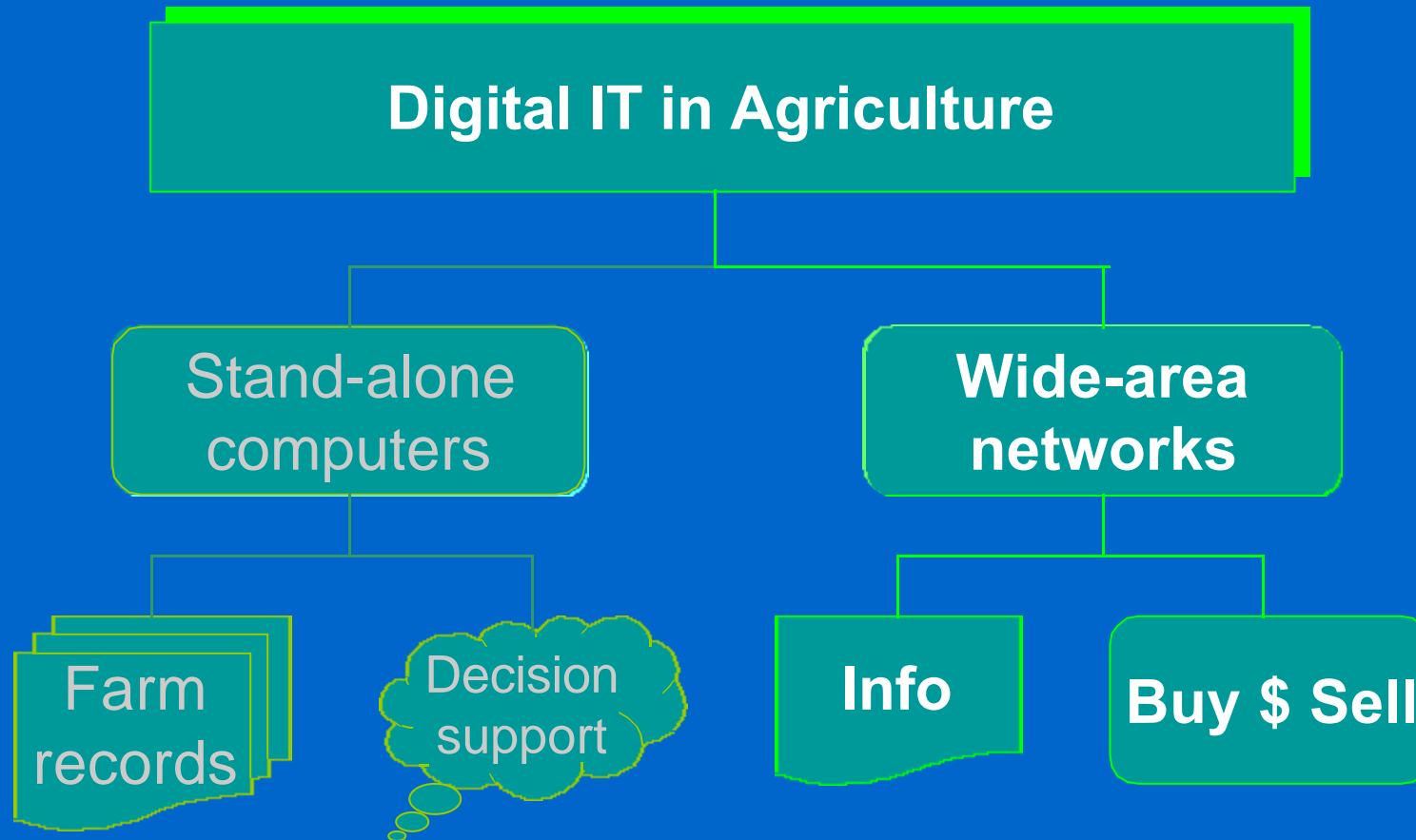
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# E-Comm > Introduction



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## E-Comm > Introduction

### E-Commerce defined:

- ❖ "... **sales** of goods and services over the **Internet**, an extranet, Electronic Data Interchange (EDI), or other online systems. Payment may or may not be made online". (U.S. Census Bureau 2000)
- ❖ "... **business** occurring over networks that use the Transmission Control Protocol/Internet Protocol (TCP/IP), i.e. the Internet, intranets, and extranets". (OECD 1998, p. 9)
- ❖ "... trade that actually takes place over the Internet, usually through a buyer visiting a seller's **website** and making a **transaction** there." (Economist, March 2000)

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# E-Comm > Introduction



# E-Comm > Readiness

## E-Readiness rankings (top 20)

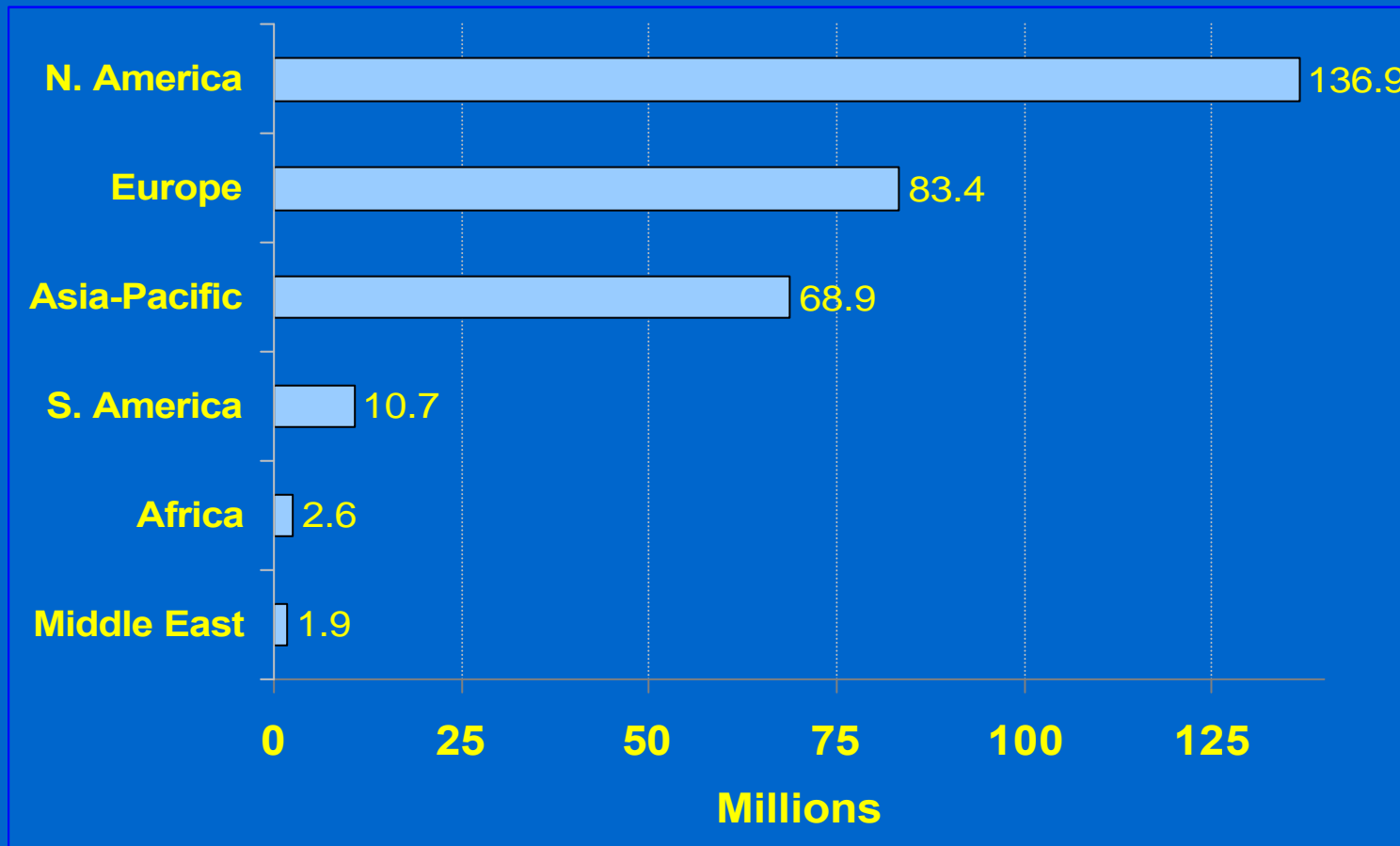
- |                    |                  |
|--------------------|------------------|
| 1 - United States  | 11 - Ireland     |
| 2 - Sweden         | 12 - Denmark     |
| 3 - Finland        | 13 - Germany     |
| 4 - Norway         | 14 - France      |
| 5 - Netherlands    | 15 - Belgium     |
| 6 - United Kingdom | 16 - Australia   |
| 7 - Canada         | 17 - New Zealand |
| 8 - Singapore      | 18 - Austria     |
| 9 - Hong Kong      | 19 - Italy       |
| 10 - Switzerland   | 20 - Israel      |

e-readiness =  
f (level of connectivity,  
online business culture)

Source: Economist Intelligence Unit 2000  
in ITTA 2000.

# E-Comm > Readiness

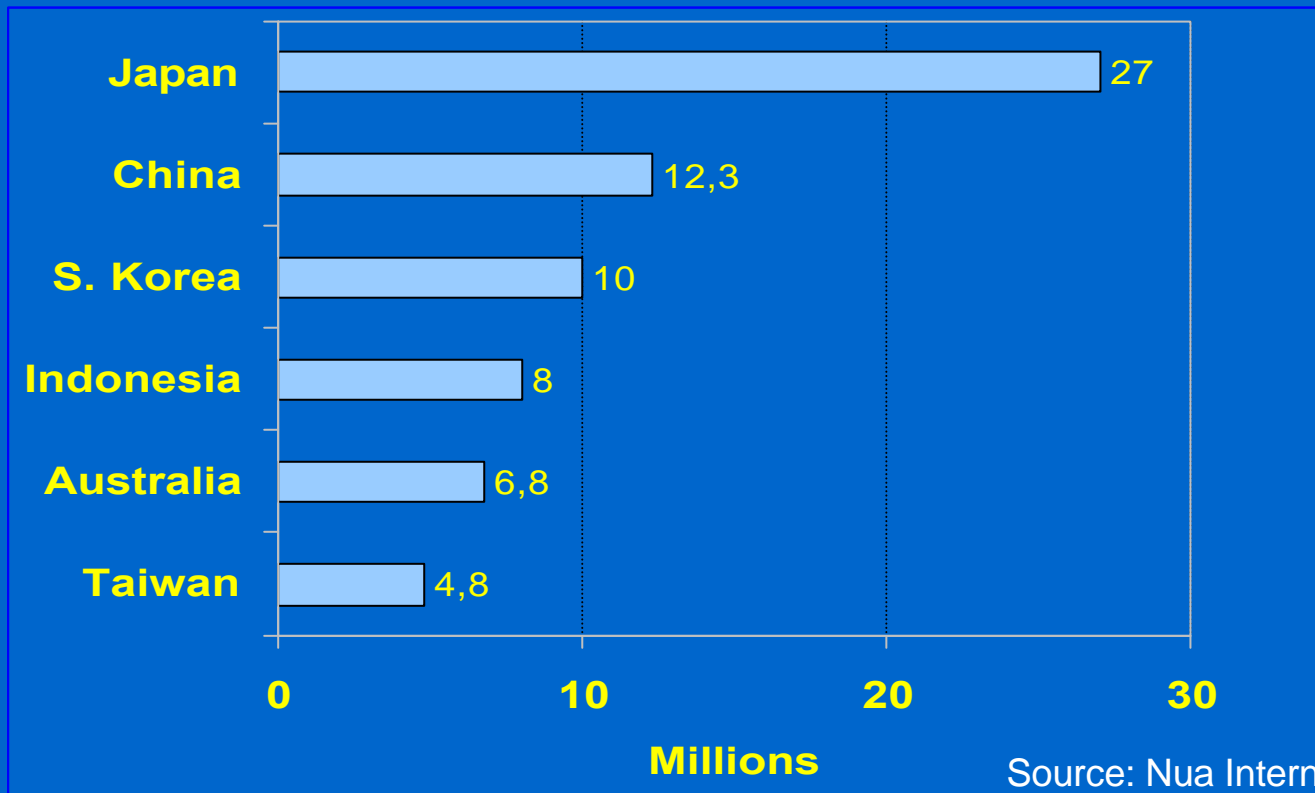
## Total Global Internet Users by Region



Source: NUA Internet Surveys, 2000  
in ITTA 2000

# E-Comm > Readiness

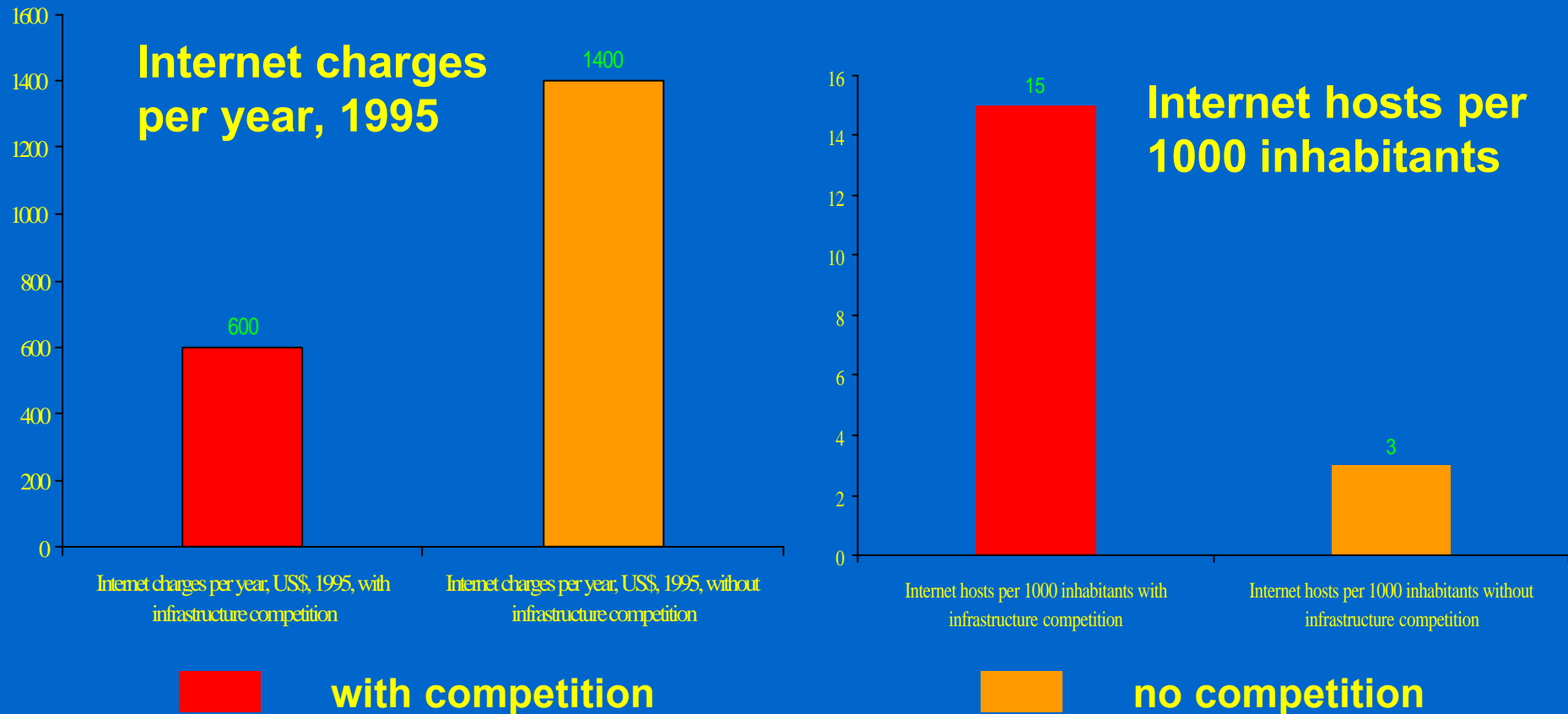
## Asia-Pacific countries with highest number of Internet users



Source: Nua Internet Surveys, 2000  
Japan Ministry of P&T 2000  
Iamasia 2000 in ITTA 2000

# E-Comm > Readiness

## Costs, competition and Internet penetration



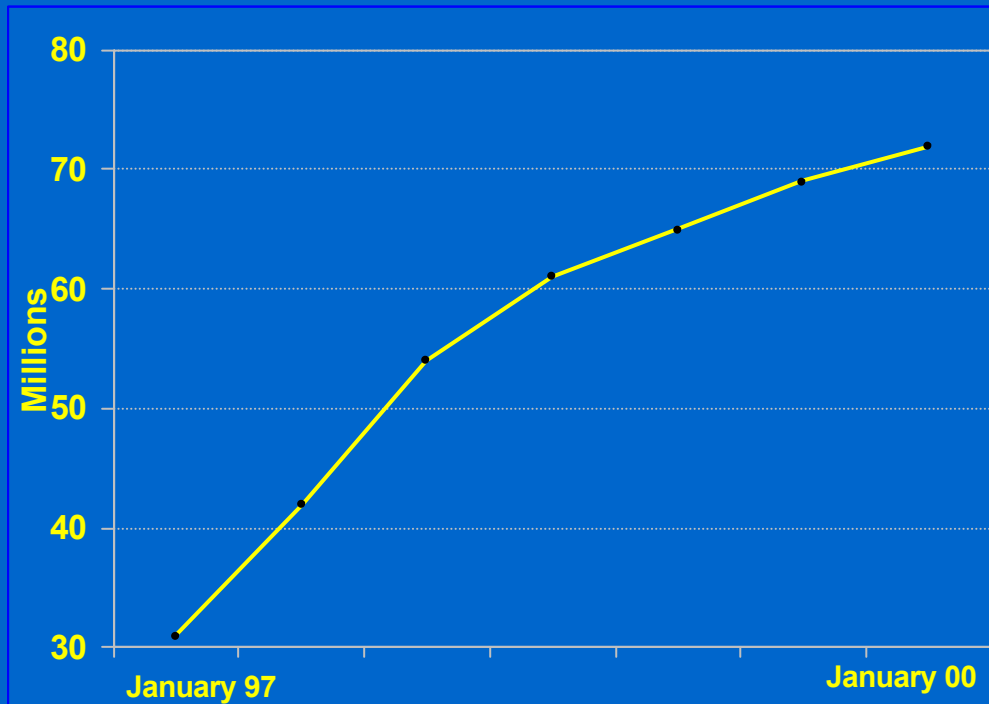
Source: WTO, 1998



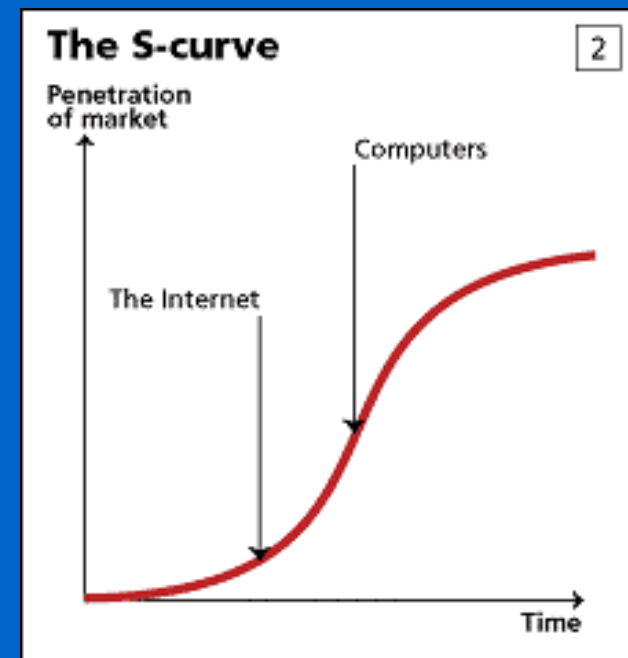
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# E-Comm > Readiness

## Active Adult Internet Users in the U.S.

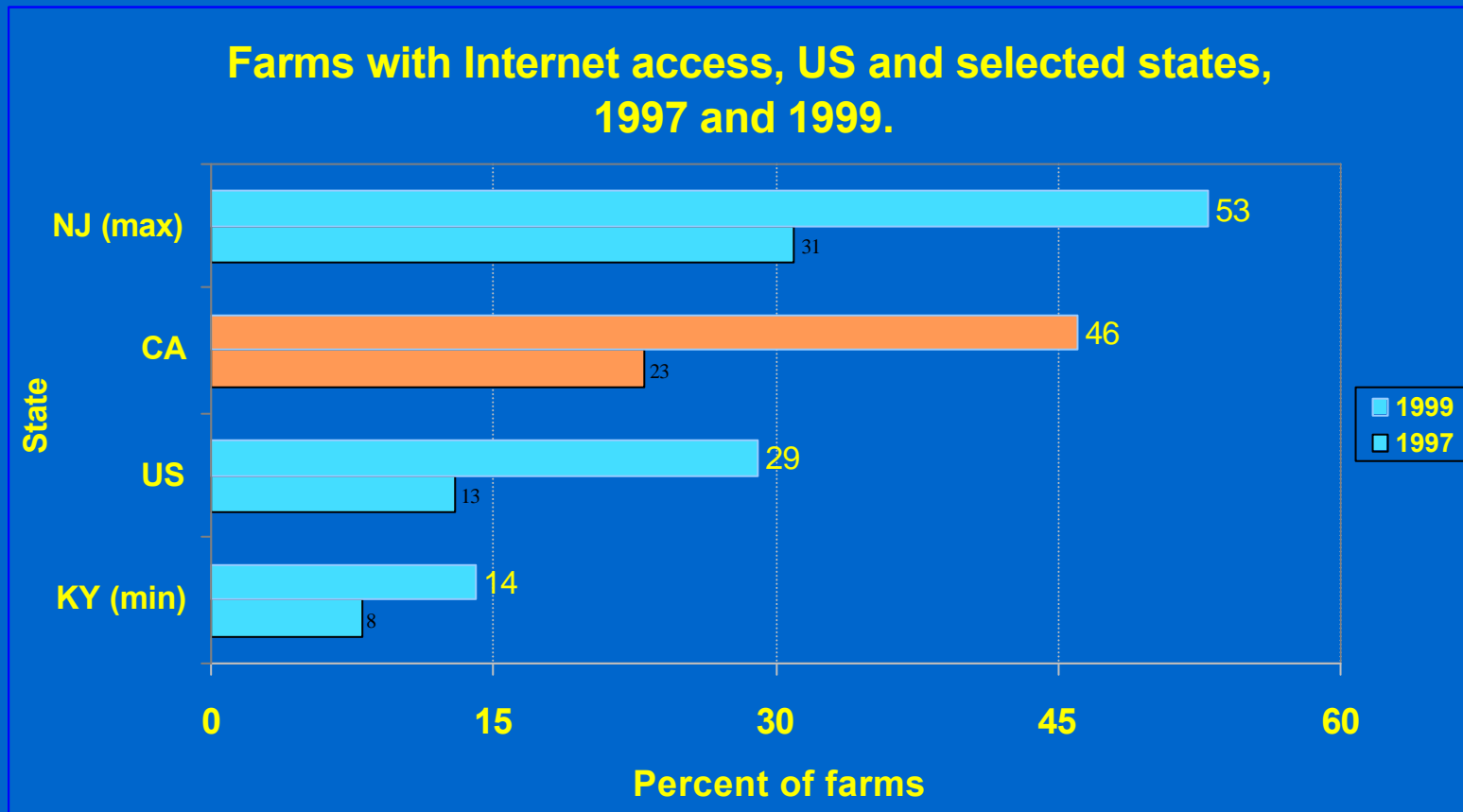


Source: Cyberdialogue 2000  
in ITTA 2000



Source: economist.com

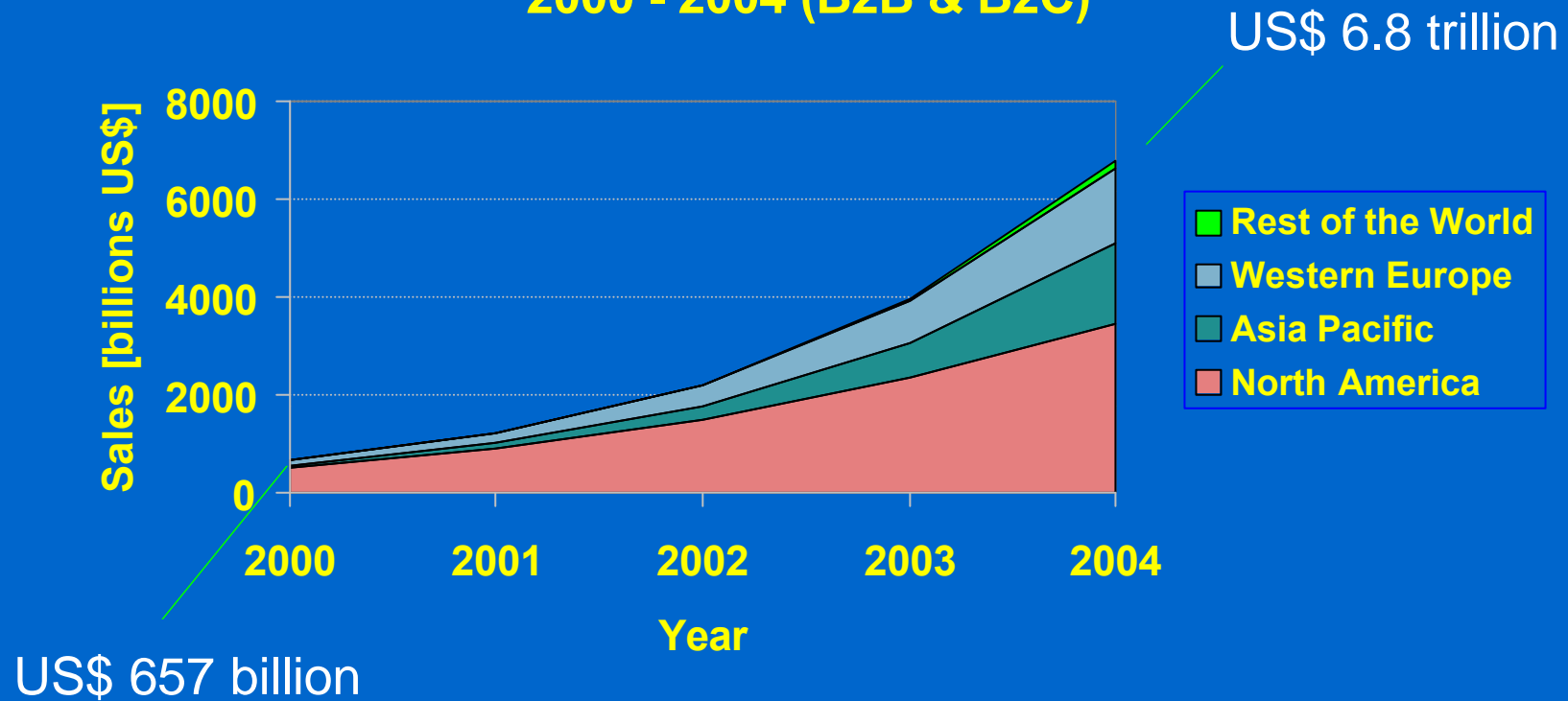
# E-Comm > Readiness



Source: NASS July 30, 1999

# E-Comm > Readiness

Expected E-Commerce Growth,  
2000 - 2004 (B2B & B2C)



Source: Forrester Research

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## E-Comm > Why & How ?

### ❖ **C2C: high-tech garage sales**

### ❖ **B2C:**

- 0.64 percent of total retail sales of \$821.2 billion in IV/99
- of interest in markets for highly differentiated or standardized products
- issues: payment, privacy, customer acquisition & retention
- **online farmers' markets; wineries online; booking farm holidays**

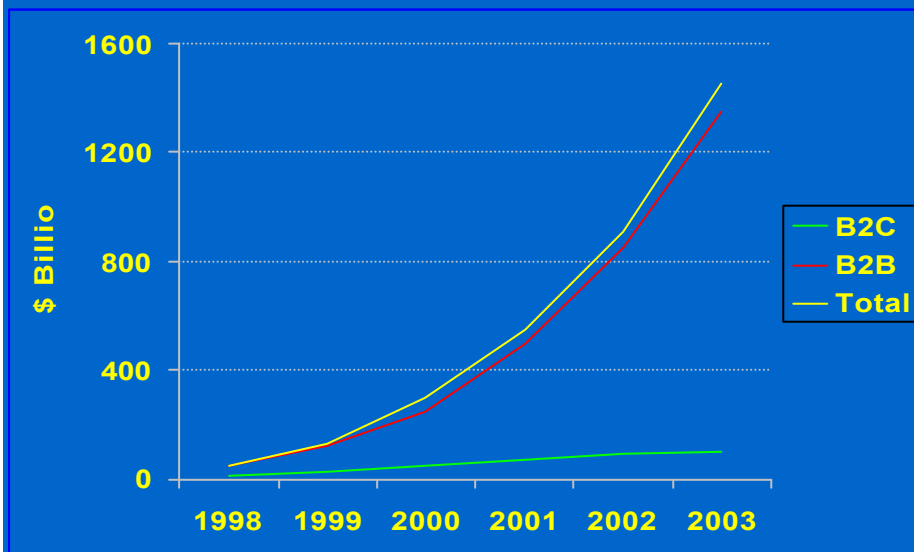
### ❖ **B2B**

- **"... roughly 1 of every 25 farms and ranches in the country bought or sold agricultural products on the Net"** (USDA Sept. 2000)
- **12% of total sales in 2004 (~ \$123 billion)** (Goldman Sachs 1999)
- **the only one of 12 industries with less than \$100 billion in B2B-sales by 2005** (Jupiter Communications Oct. 2000)

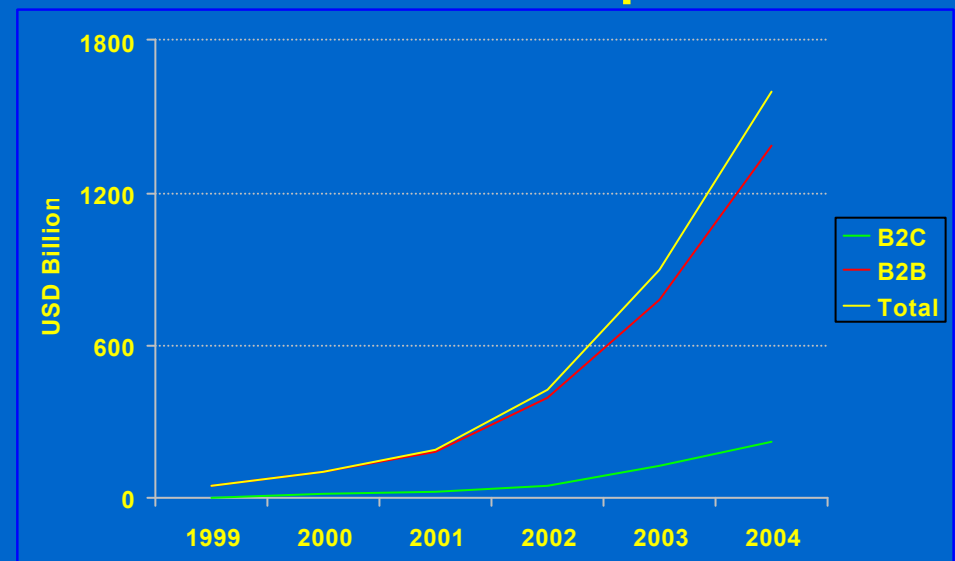
# E-Comm > Why & How ?

## Projected B2B & B2C E-Commerce

### Growth for the U.S.



### Growth for Europe



Source: adapted from Forrester Research, 2000 (Europe) and eMarketer, 2000 (US) in ITTA 2000.

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## E-Comm > Why & How ?

### Properties of B2B E-Commerce

- ❖ extended market reach
- ❖ fast
- ❖ 24-7-365
- ❖ high fix and low variable costs
- ❖ open or closed, as required
- ❖ can be customized
- ❖ standardized practices
- ❖ choice of pricing institutions
- ❖ complements conventional commerce
- ❖ etc....

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## E-Comm > Why & How ?

### **E-Commerce Applications in Agriculture**

#### ❖ **Support services**

- Internet service providers - web site programming

#### ❖ **Saving transaction costs**

#### ❖ **E-Commerce intermediation**

- Classified ads and directory services
- Match makers
- Market place providers
- Auctioneers

#### ❖ **Service integration**

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## E-Comm > Why & How > Saving Transaction Costs

**Transaction costs = Trading costs + Transport costs**

- ❖ "... it is not easy to find an actual case in which an exchange operation can be performed without any economic sacrifices at all, even if they are confined only to the loss of time."
- ❖ "Economic development tends to reduce these economic sacrifices ..."

(Menger 1981, [1881], p. 189-190)

**Even a primitive transaction includes three flows**





## E-Comm > Why & How > Saving Transaction Costs

### Transaction cost savings of banks

		Bank transaction	Paying a bill
Conventional	US\$	1.08	2.22 – 3.32
by telephone	US\$	0.54	n. D.
on the Internet	US\$	0.13	0.65 – 1.10
Saving	%	89	71 - 67

*Does the Internet increase or decrease customers' transaction costs?*

Source: OECD 1999.  
The economic and social impact of electronic commerce. p. 63.

- Farmpartner.com expects "process costs" savings of 3-7%
- Suedzucker expects to reduce purchasing costs from 350 DM to 50-100 DM per transaction

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## E-Comm > Why & How > Saving Transaction Costs

### **Delivery of digitized information products**

#### **❖ Information**

- weather forecasts
- market news & forecasts

#### **❖ Management and consulting services**

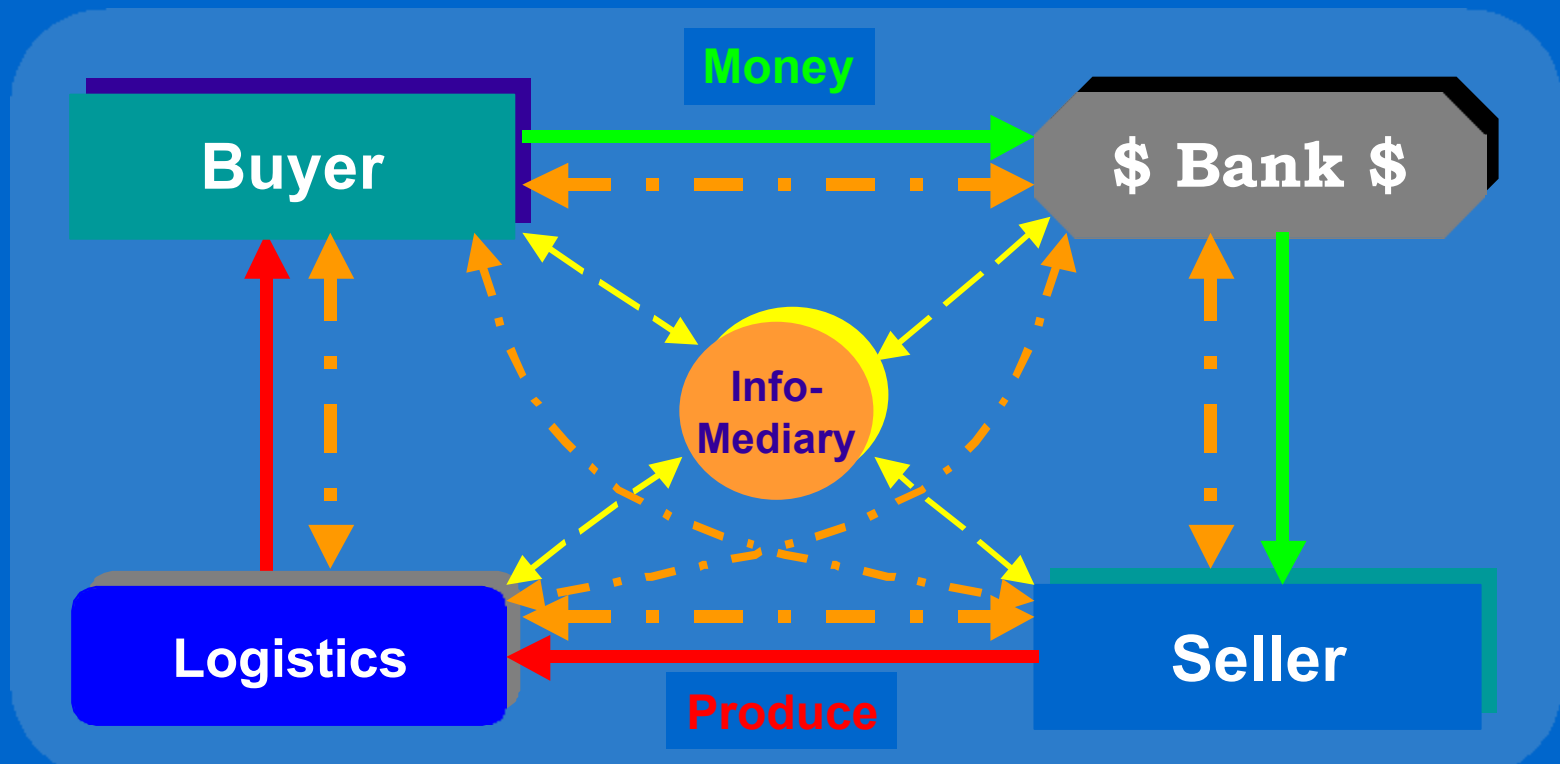
- data management & analysis
- decision support

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# E-Comm > Why & How > Intermediaries

**Ideally, in e-commerce all flows are in bits  
(agriculture is not ideal)**

Number of bi-directional info-links:  
 Without infomediary:  
 $\frac{1}{2}n(n-1)$   
 With infomediary:  
 $n$

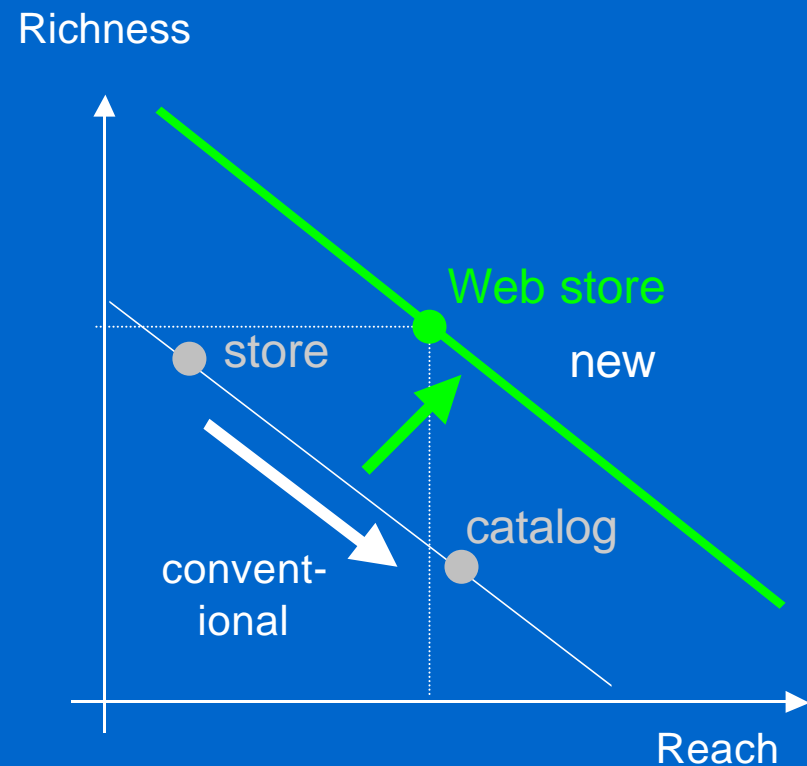


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# E-Comm > Why & How > Intermediaries

## Causes of disintermediation

- ❖ conventional:
  - more reach for less richness
    - catalog-business
    - telephone broker
- ❖ new:
  - shifting the R-R-frontier
    - photos & video on the web
    - interactive auctions
- ❖ critical constraint:
  - the "human interface"



Source: Evans & Wurster 2000

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## E-Comm > Why & How > Intermediaries

### **Classified ads and directory services**

- facilitate search & save time
- often specialized in product categories (one or several)

### **Match makers**

- connect buyers and sellers
- interactive price quote requests

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# E-Comm > Why & How > Intermediaries

## Detaching information from products

**Natural**

Info about reality



**Cultural**

Info for reality



**Technological**

Info as reality



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## E-Comm > Why & How > Intermediaries

### **Market place providers**

- ❖ **allow buyers and sellers to meet & communicate**
- ❖ **specify and enforce rules for trading**
- ❖ **mostly several commodities and inputs**
- ❖ **hope for large and liquid market**
- ❖ **variation w.r.t.**
  - access to logistics services
  - access to transaction information
  - accept title & risk

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## E-Comm > Why & How > Intermediaries

### Auctioneers

- ❖ also provide a market place
- ❖ **and** detailed rules for price determination
- ❖ hope to increase market liquidity
- ❖ various bidding rules
- ❖ often combined with additional services
- ❖ long tradition in electronic markets



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## E-Comm > Why & How > Intermediaries

### Service integrators ~ Portals

- ❖ **serve as entry points for users on the web**
- ❖ **two part business model**
  - business with the portal
  - satisfy users' information needs
- ❖ **balance between**
  - keeping users at the portal
  - leading users to other sites

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## E-Comm > What ?

### **Goods traded**

#### ❖ **Inputs**

- ag. chemicals - seed - machinery parts - etc.

#### ❖ **Outputs**

- produce - livestock - used machinery - etc.

#### ❖ **Rights and obligations**

- water - insurance - quotas

#### ❖ **Information**

#### ❖ **Management services**

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## E-Comm > Whither ?

### ❖ Moore's Law of computer power

- Computer capacity on a chip doubles every 18 months
- the capacity to carry out 1000 calculations per second cost about \$180 in 1980 and \$0.0075 by 1998; **- 43% p.a.** (Kurzweil, 1999)

### ❖ Hard disk capacity growth

- density of data stored on hard disks increased  $1.3 \cdot 10^6$  since 1957
- disk capacities are recently doubling every nine months
- price per megabyte for hard disk drives has fallen from \$11+ in 1988 to \$ 0.02 in 1999 and \$0.003 in 2002; **- 45% p.a.** (Toigo 2000)

### ❖ Agents or Bots

- information management
- price search
- customize
- negotiate

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# E-Comm > Whither ?

Growth in microprocessor capacity will continue  
but trend in hard disk capacity is in doubt

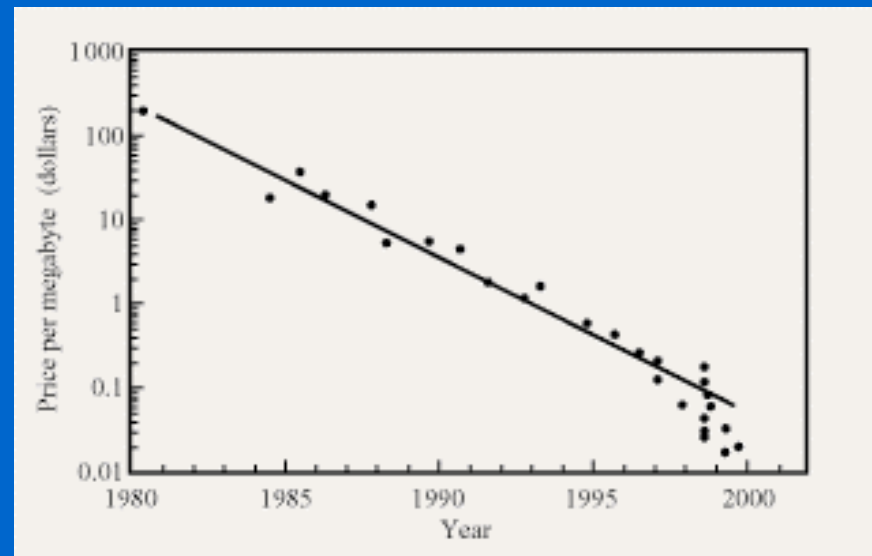
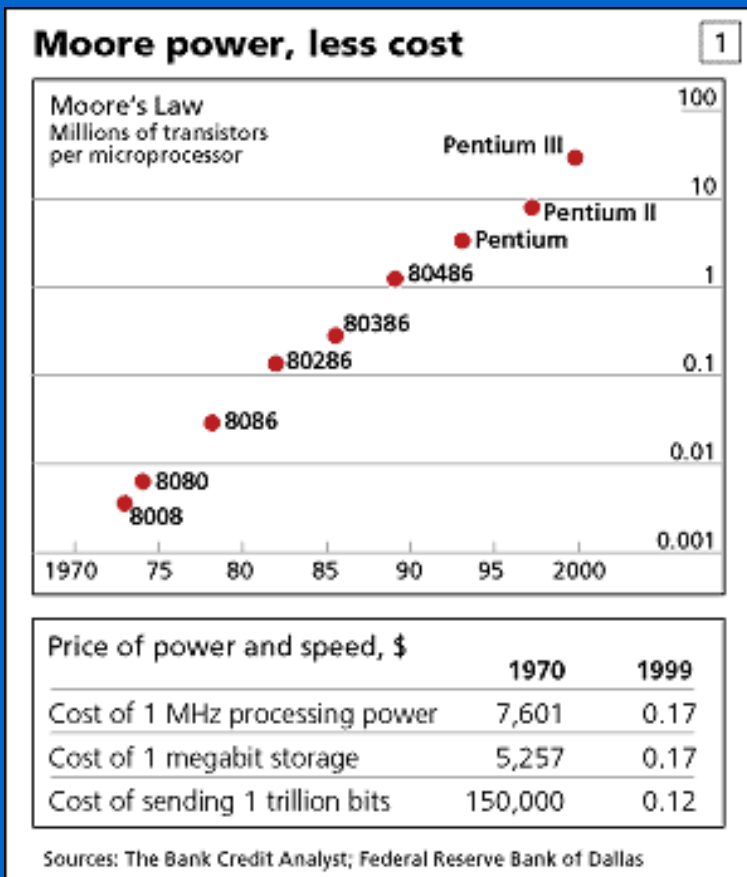


Figure 2

Price history of hard disk products vs. year of product introduction.

Thompson, D.A. and Best, J.S. 2000. The future of magnetic data storage technology. IBM Journal of Research & Development 44(3). [www.research.ibm.com/journal/](http://www.research.ibm.com/journal/)

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## E-Comm > Whither ?

### ❖ Gilder's Law of (fiber) Bandwidth

- Communication power doubles every 6 months (3x-computer power)  
➡ Use bandwidth to simplify everything else!

### ❖ Metcalf's Law

- The value of a network to its users is approximately proportional to the square of the number of its users => increasing network effect!

### ❖ de Long's Law

- In building a network, you tend to do the most valuable connections first ➡ it is not clear whether the network effect goes up or down!  
(P. Krugman)

### ❖ Zipf's Law (as applied to the Web)

- Traffic at a site ~ 1/ rank number of the site
- Some will be very big, most will be minute, a few in between

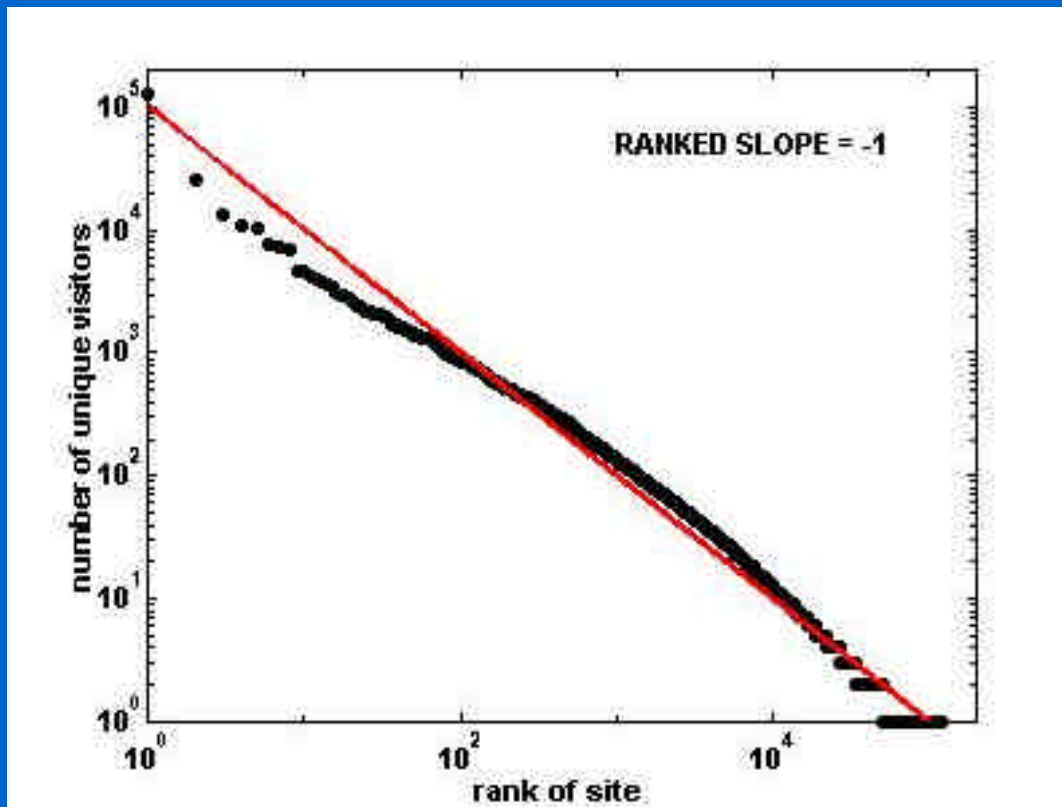
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# E-Comm > Whither ?

## Zipf's Law:

AOL users' visits to various sites on a day in December 1997

**red line: ideal Zipf; black dots: observed;** most popular site: Yahoo, 129,641 visits



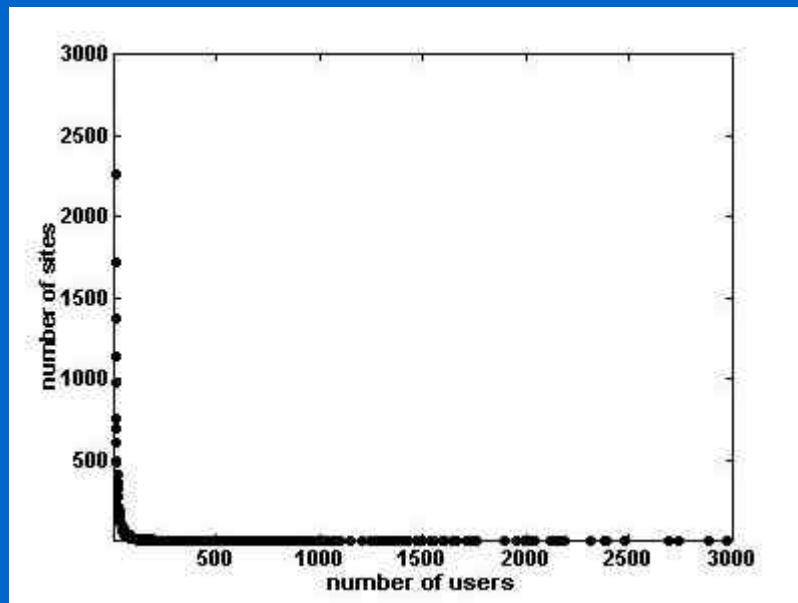
Source: Adamic, L.A. 2000  
Zipf, power-laws, and Pareto  
- a ranking tutorial.  
[www.parc.xerox.com](http://www.parc.xerox.com)

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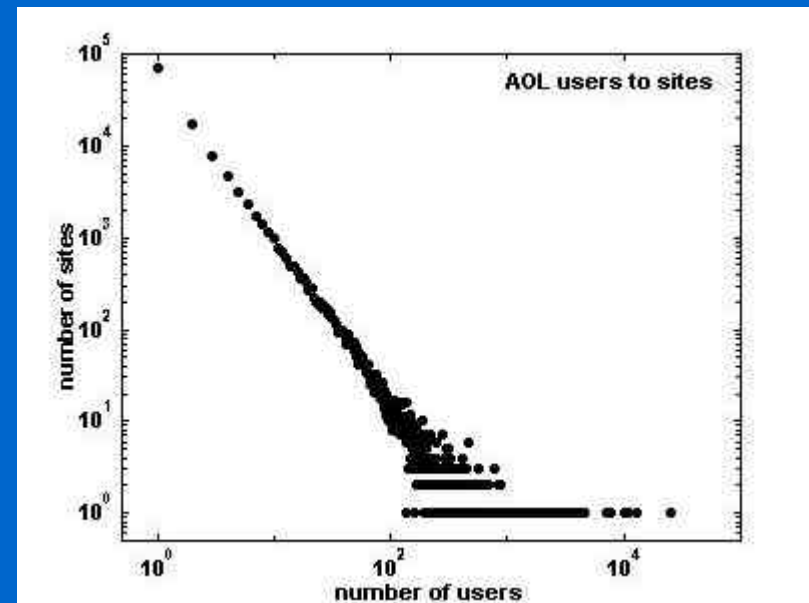
# E-Comm > Whither ?

A small number of sites attracts most of the visits  
AOL users' visits to various sites on a day in December 1997

Number of sites by number of users



The same on a log-log-scale

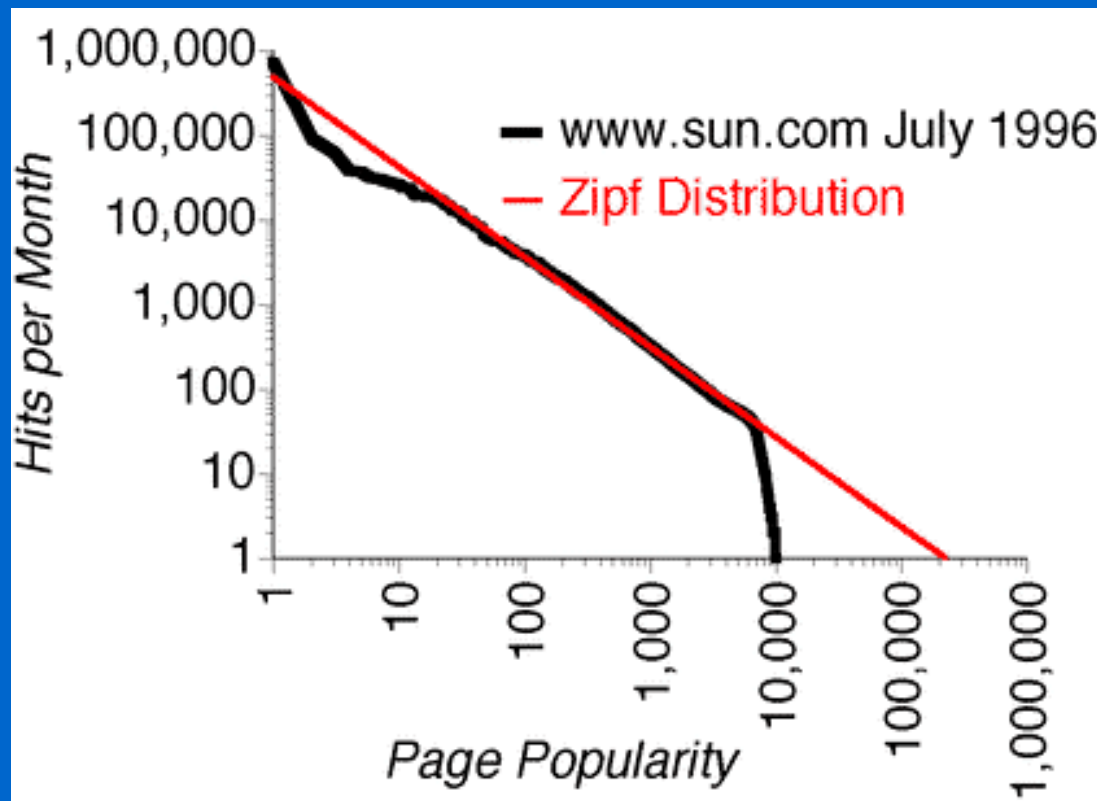


Source: Adamic, L.A. 2000. Zipf, power-laws, and Pareto - a ranking tutorial. [www.parc.xerox.com](http://www.parc.xerox.com)

# E-Comm > Whither ?

## Zipf's Law:

Requests for web pages at Sun's web site during a month



Nielsen, J. 1997.  
Zipf curves and website popularity.  
[www.useit.com/alertbox/zipf.html](http://www.useit.com/alertbox/zipf.html)



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## E-Comm > Whither ?

### **Regulatory environment**

- ❖ **Security**
- ❖ **Authenticity**
- ❖ **Market intelligence**
- ❖ **Taxes**
- ❖ **Industry regulation**

### **Internal dynamics**

- ❖ **Standards**
- ❖ **Entrepreneurs and infomediaries**
- ❖ **Competition**
- ❖ **Finance**

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## E-Comm > Close

- ❖ **Who will be the winners and losers?**
- ❖ **What impact on farms, markets, consumers?**
- ❖ **How to harness e-commerce?**

*We cannot cry  
'FULL SPEED AHEAD'  
and trust that the outcome will be desirable.*

*Brown & Duguit 2000, p. 41*